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ABSTRACT

Jean Piaget's theory seems to lend support to reading specialists who believe that concrete operational thought constitutes a necessary and sufficient condition for learning to read. Preoperational children cannot deal with the complex relationships inherent in reading because they are tied perceptually to the immediate situation or representations of past perceptual situations. They cannot make mental comparisons or explore the similarities and differences in previous cognitive encounters. In situations when relationships are not perceptually apparent but must be "seen" through reason, preoperational children are at a loss. Even though the preoperational child has the symbolic function, it must be remembered that symbols are a part of functioning and therefore cannot go beyond the level of that functioning. Briefly, symbols are meaningful only if the individual has an operative scheme into which the symbol is assimilated. Before schemes are operational, symbols can do no more than reflect reality--and the reality reflected is devoid of multiple characteristics and complex relationships. The reality of print, however, is one of complex multiple relationships. It is therefore not surprising that preoperational thinkers are likely to have difficulty in learning to read. (Author/FL)

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COGNITIVE STRUCTURES AND LEARNING TO READ: AN ANALYSIS FROM PIAGETIAN PERSPECTIVES

A paper presented at the tenth annual UAP-USC International Interdisciplinary Conference on Piagetian Theory and the Helping Professions

Los Angeles, 1980

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COGNITIVE STRUCTURES AND LEARNING TO READ:

AN ANALYSIS FROM PIAGETIAN PERSPECTIVES

Some reading specialists have examined Piaget's theory of developmental intelligence in hopes that it will help them discover what type of cognitive activity learning to read requires. The suggest that if not a pre-requisite for reading, the attainment of the concrete operational level of thinking at least facilitates the process of learning to read (Raven and Salzer, 1971; Heatherly, 1974; Cox, 1976; Elkind, 1976; Roberts, 1976; Kirkland, 1978).

In order to evaluate the suggestion that preoperational thought makes learning to read difficult if not impossible, it is necessary to utilize the Piagetian framework to analyze what is involved in learning to read. The paradigm in which learning must take place for preoperational thinkers will be presented, and the task of learning to read will be interpreted in light of each characteristic of the paradigm.

Preoperational children are incapable of attending to all characteristics of a perceptual event. Rather, they center on one salient characteristic while ignoring all others. Thus they often misrepresent what they see, and their thinking is consequently characterized by a lack of stability or cohesiveness: preoperational children are largely controlled by what they are perceiving at the moment. Things are what they appear to be. There is no reordering or refashioning of events.

Because there is no one-to-one correspondence in grapheme-phoneme relationships, the inability to decenter (consider all characteristics simultaneously) causes severe problems in learning to read. The child cannot logically consider all possibilities and choose the operative one (Elkind, Larson, and VanDorninck, 1965). Problems can also arise when preoperational thinkers are confronted with an array of letters (words). Since they have successfully dealt with letters in isolation, it seems to the teacher (whose cognitive structures are more advanced) that it should be a simple task to blend the sounds represented by the letters into words. To perform this task, the child must focus on several features of the letter array simultaneiously. Even when a word is successfully identified in a particular context, the child must focus on more than one aspect of a word in order to be able to transfer that recognition to new situations (Samuels and Jeffrey, 1966). Preoperational children characteristically focus on one aspect and ignore the rest. They do not realize that the while remains the same regardless of what single characteristic they observe. Therefore the next time they encounter the word they will not recognize it if they happen to center on a different characteristic.

Preoperational thought is egocentric. The world is as it looks to preoperational children; they cannot take another's point of view, nor can they regard their own point of view as just one of several possibilities. It is very difficult if not impossible for preoperational children, then, to "internalize" the fact that one letter can symbolize more than one sound or that one sound can be represented by more than one letter or combination of letters. They can memorize these rules, but they must make future reading decisions by searching rules rather than by

operating directly on the symbols themselves through application of appropriate cognitive structures.

Egocentrism results in the preoperational child's feeling no need to logically justify his/her reasoning. Every event is a new event, disconnected from past events and unrelated to future events. There is no attention to coordination, prediction, or explanation (Almy, Chittenden, and Miller, 1966). The preoperational child neither looks for nor finds contradictions in his/her world, though s/he often expresses multiple hypotheses that are very contradictory from an adult's point of view. It is difficult for him/her to learn from mistakes--s/he simply does not make any! Thus it becomes difficult for the child to know what a particular symbol in a particular situation is not--knowledge that is required for reading in a system where there is no one-to-one correspondence between graphemes and phonemes.

Another characteristic of preoperational thinkers that is likely to interfer with the process of learning to read is their inability to deal with transformations. Preoperational thinkers center on the results of transformations (successive states) without noticing the steps in arriving at those states. Thus their thinking is static and immobile. Their focusing on momentary characteristics rather than the transformations makes it impossible for them to "link" successive conditions into a meaningful, integrated totality. Preoperational students can easily learn to recognize letters in isolation, and they can even learn to recognize some words, but until they learn that letters can undergo any number of transformations (appear in different contexts) without losing their unique characteristics, they will never learn to read. Indeed, the nature of the transformation will in part determine the represented sound (example: hid becomes hide, "i" remains the same,

but when transformed to a new context, it's phonemic correspondence changes). To "see" that things remain the same even though they change requires concrete operational cognitive structures.

Centration, egocentrism, and the inability to perceive transformations all contribute to the preoperational thinkers' difficulties in recognizing relationships among events. Thus when exposed to letters of the alphabet in context (so the artificial, one-to-one correspondence between the sign, "t;" the name, "tee;" and the sound, /t/ no longer suffices) the preoperational child will not be able to conceptualize the myriad grapheme-phoneme relationships required for effectove reading.

A preoperational child who perceives an event attaches a significant "cause" to whatever is happening simultaneously and expects in the future that the cause will lead to the event (Piaget, 1951). When dealing with print in context, one perceptual event (a particular sound) does not always come from the same cause (a particular letter). This results in much confusion for the preoperational thinker.

Another relationship that escapes notice of the preoperational child is the relationship that exists between parts and wholes (combinatorial thinking). His/her tendency to center on one aspect of an event often causes him/her to not even notice the while--or if s/he does, s/he will not notice the parts. The problems this creates for the preoperational thinker in attempting to learn to read are obvious: blending will be an extremely difficult task because the letters will be noticed rather than the whole they combine to form. The preoperational child will thus find it very difficult to recognize digraphs and consonant blends. The preoperational child who centers on the whole rather than the parts (and thus loses track of differences

because s/he is centering on similarities) will have trouble in distinguishing, for example, cat from cut or wash from wish (Kirkland, 1978). S/he will see a new word as a whole new event rather than perceiving the task to be one of "adding sounds already known." (Samuels, 1976).

Reasoning by proximity, failure to see relationships between parts and wholes, perception of transformations as new events, and disability in combinatorial thinking all lead to multiple, contradictory explanations when preoperational thinkers attempt to classify or categorize. The major problem for preoperational children when attempting to categorize or classify lies in their inability to make comparisons on two levels at once. They are therefore unable to "shift" criteria or to predict ways in which objects might be classified (Inhelder, 1962). This increases the difficulty of the task of learning to read. If preoperational thinkers cognitively encounter "ea" for example, they will probably not be able to "internalize" the fact that it is a simultaneous member of two different subclasses (long e as in treat; long a as in great). Predictions about what the sound could be are thus likely to go awry. Class inclusion problems also arise when the student encounters a single word that can differ syntactically, semantically, and/or phonetically in different contexts.

Because preoperational children cannot perceive relationships among perceptual events, they are capable of neither inductive nor deductive reasoning. Rather their thinking is transductive--from the particular to the particular. They make no attempt to integrate new perceptual information into a related whole--they feel no cognitive necessity to do so: the world is as it seems; everything takes place because it must be so. Since the ability to integrate visual cues is essential to

reading (Kagan, 1973), transductive thinkers are operating under an obvious handicap. They are likely to forget cues from the first part of the word (or sentence) by the time they get to the end. Their propensity to see each visual array as an entirely new event makes it unlikely that they will ask the questions they need to know to learn to read.

A final characteristic of preoperational thought that interfers with learning to read is its concreteness. Even though preoperational children have the symbolic function, the representations they are capable of making are in the nature of reproducing past events; preoperational thinkers cannot analyze and/or abstract. Their cognitive structures do not allow them to transcend the symbolic image--they are dependent on the physical characteristics of the objects they are symbolically representing. Thus the strategy of abstracting and generalizing (recurring word parts, grapheme-phoneme relationships, syntactic relationships, semantic relationships) when attempting to learn to read is not available to preoperational thinkers. In this case, the stimuli of the printed page may not be merged into concepts but may remain a succession of objects.

SUMMARY

Piaget and Piagetian scholars have provided a great deal of evidence supporting the contention that children's cognitive structures determine their level of functioning. If data presented cannot be assimilated into existing structures (and the accomodation required to be able to assimilate is too great), then the students will not learn that which is being presented. They can (depending on the nature of the task) often be conditioned to give a correct response (from the teacher's point of view; i.e., as viewed from her/his cognitive structures),

but this is not true learning. The children are merely routinely using rules or simple association rather than comprehending a symbolic strategy.

The above discussion details the effect preoperational structures have on the process of learning to read. Briefly, preoperational children cannot deal with the complex relationships inherent in reading because they are tied perceptually to the immediate situation or representations of past perceptual situations. They cannot make mental comparisons or explore the similarities and differences in previous cognitive encounters. In situations when relationships are not perceptually apparent but must be "seen" through reason, preoperational children are at a loss. Even though the properational child has the symbolic function, it must be remembered that symbols are a part of functioning and therefore cannot go beyond the level of that functioning (Furth, 1970). In short, symbols are meaningful only if the individual has an operative scheme to which the symbol is assimilated. Before schemes are operational, symbols can do no more than reflect reality--and the reality reflected is devoid of multiple characgeristics or complex relationships.

CONCLUSIONS

Piaget's theory seems to lend support to those reading specialists who believe that concrete operational thought constitutes a necessary and sufficient condition for learning to read. Reading seems to be a complex cognitive act requiring deliberate analytic action and mental experimentation that in turn requires concrete operational thought.

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